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# Formal Drawings

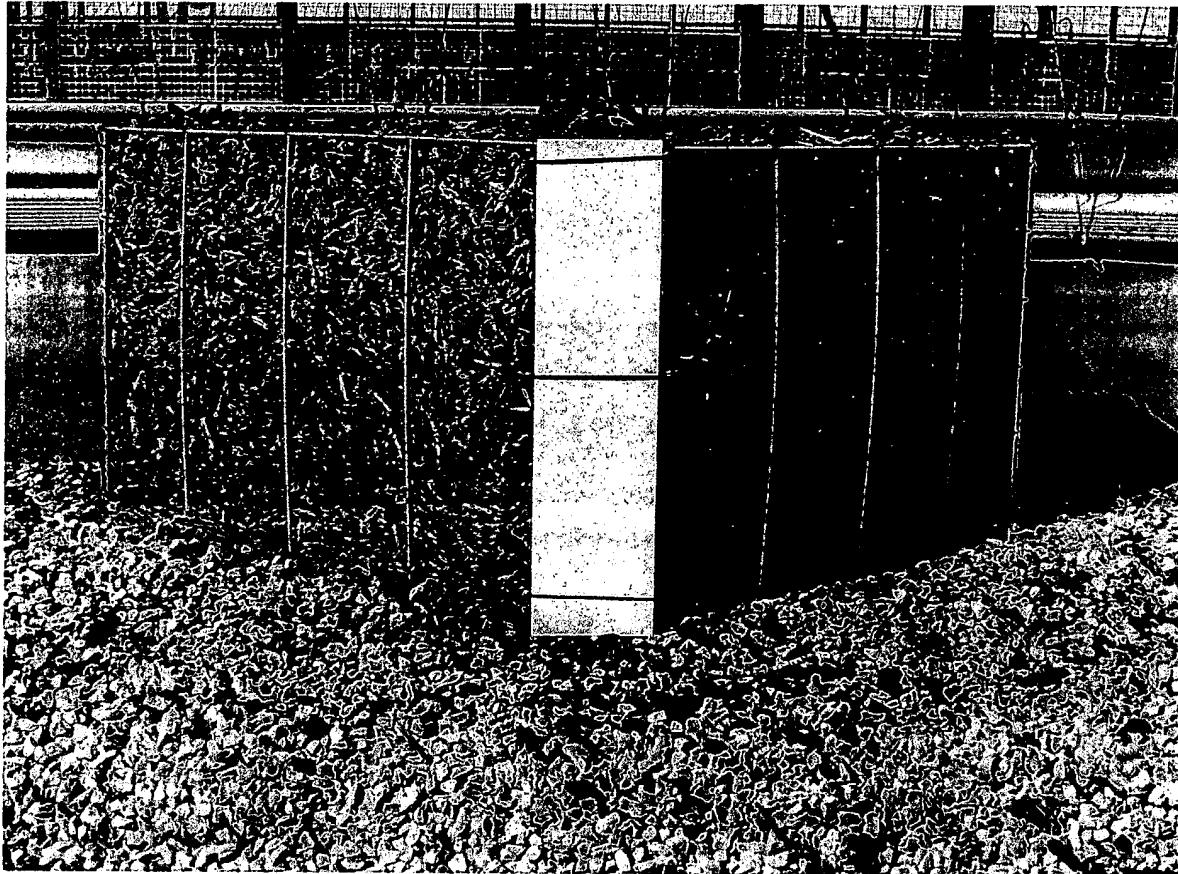
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**Application/Control Number: 10/709,457**

**Art Unit: 3644**

**Examiner: Elizabeth A. Shaw**

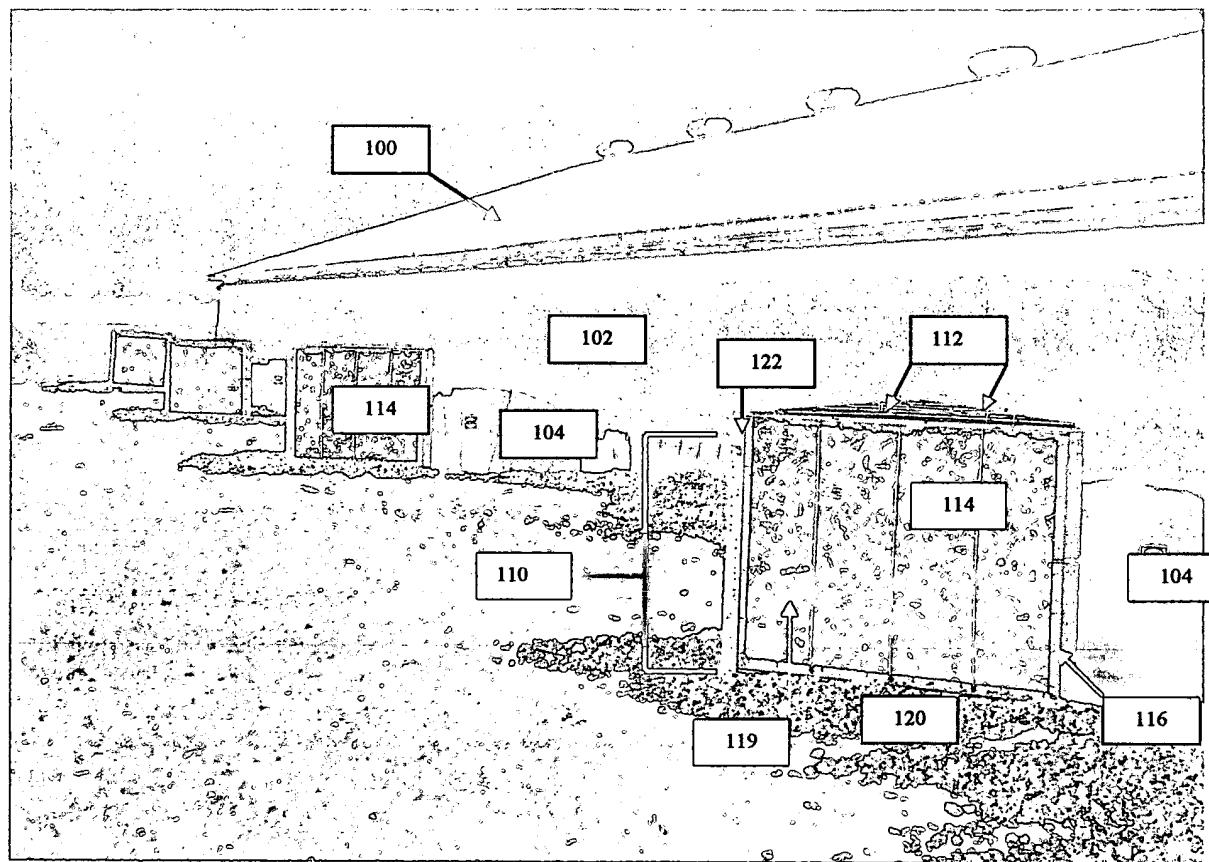


## **Odor Reducing Device**

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100-3

Figure 1: Perspective View of Filters on a Swine Production Facility

The facility 100 may represent a typical confinement building with a concrete waste pit underneath it for collecting animal waste. Exhaust ports 104 control ventilation within the building by using exhaust fans ranging from 1500 cubic feet per minute (cfm) to 10,000 cfm. Odor reducing devices 110 filter exhaust emissions reducing odor. A rock base of 1 inch to 2 inch clean rock is used as a leveling base.

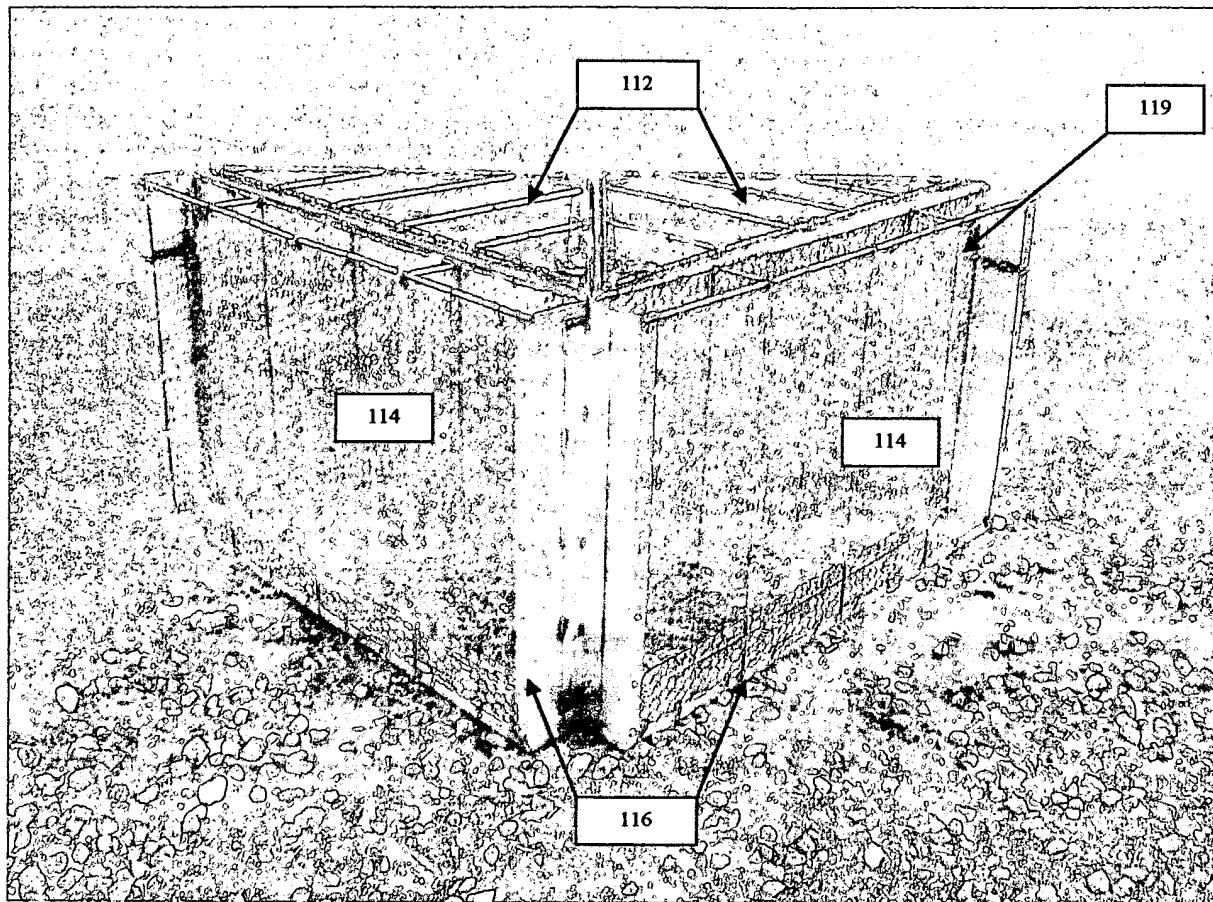


Numerical Legend:

- 100: swine production facility
- 102: exterior wall of building
- 104: exhaust ports
- 110: filter system
- 112: top section (2 panels) of filter system
- 114: side section of filter system
- 116: frame of side section
- 119: filter medium
- 120: rock base for filter system
- 122: front panel of filter system

## Figure 2: Perspective View of a Single Filter

Figure 2 shows an empty filter. It is comprised of two side panels 42 inches tall by 5 inches thick by 56 inches long. The sides and bottom are enclosed using 18-gauge stainless sheeting allowing for containment of the filtering bark. 5/16-inch stainless steel rods add support to the sidewalls and allow for the top to remain open for easy access to refilling the filtering panels.

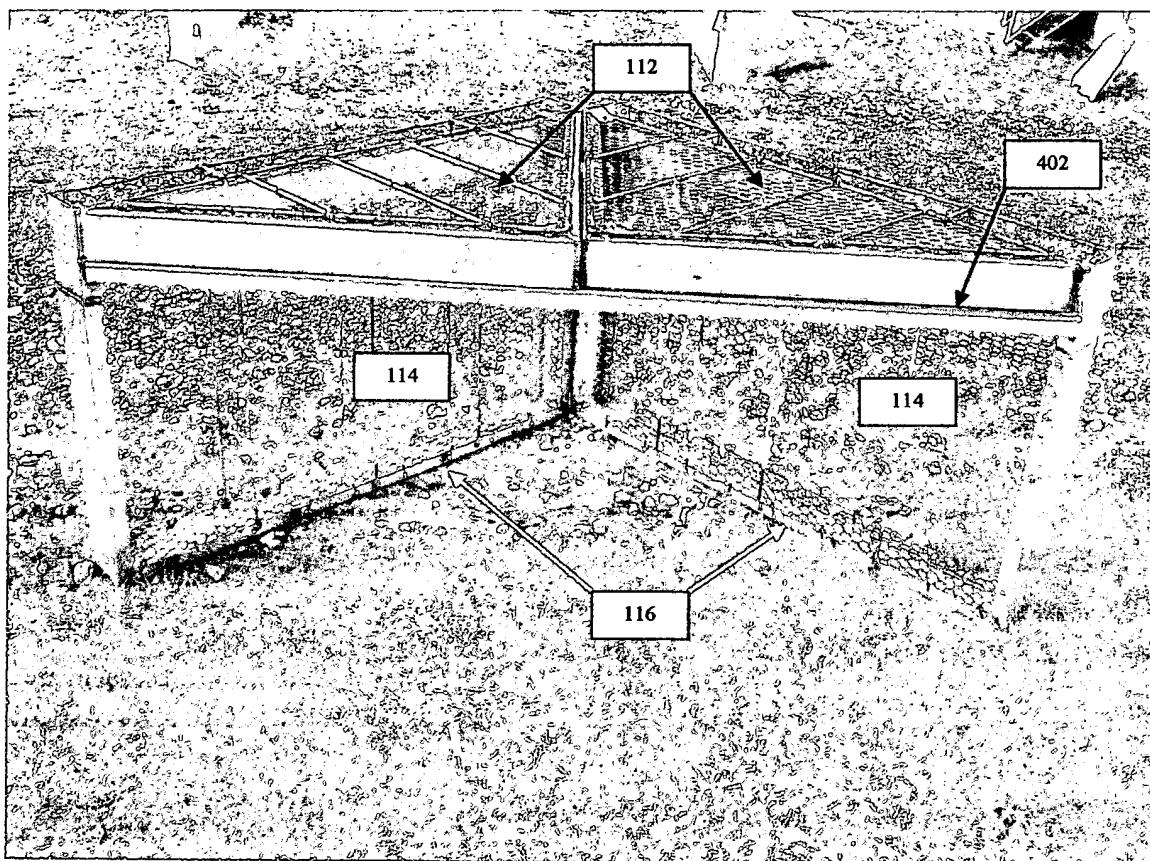


### Numerical Legend:

- 112: top section of filter system
- 114: side section of filter system
- 116: frame of side section
- 119: space for filter medium (empty)

### **Figure 3: View of Back of Filter Before Addition of Filtering Media**

The top panels are right angles with the 2 sides measuring 39 inches and the long side measuring 55 inches. They are 5 inches thick with top hinges so that they can be opened for filling. The hinges are in the center. On the 55 inch side, there is a hook in the center that slips over the side panel to prevent gapping (see Appendix A Figure 9). The 2 top filters are supported by a u shaped beam 76  $\frac{3}{4}$  inches long by 2 inches wide with 1 inch sides forming the u. 1/4 inch bolts  $\frac{1}{2}$  inch long are welded  $\frac{3}{4}$  inch from the end to fit into the support tab on the side panels (see Appendix A Figure 12).

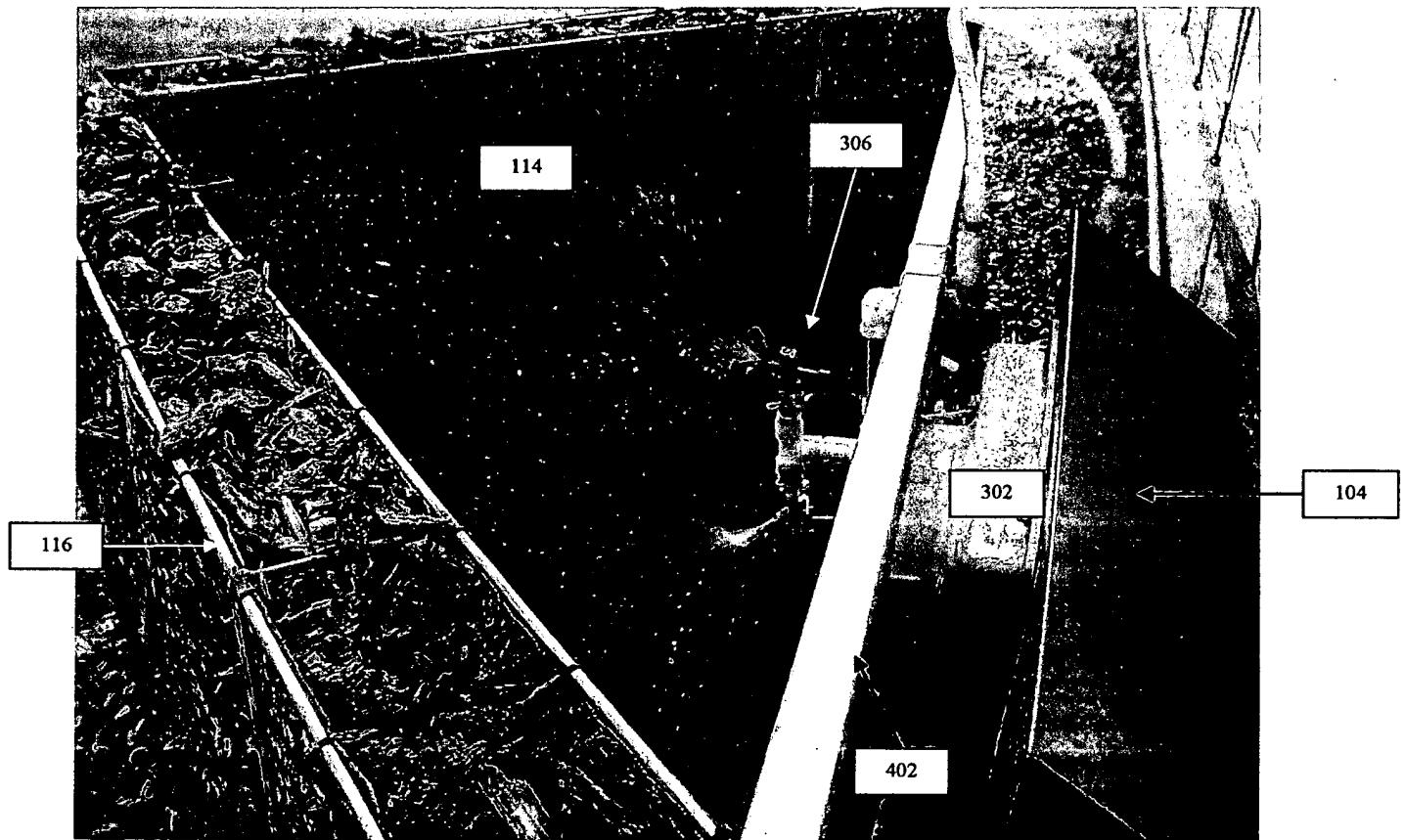


#### **Numerical Legend:**

- 112: top sections of filter system
- 114: side sections of filter system
- 116: frame of side sections
- 402: support channel for top filter sections

## **Figure 4: Perspective View with Top Panel Removed**

Figure 4 represents an odor reducing device with the top filter panels removed. A hydration system consisting of PVC tubing, plastic hose and irrigation sprinklers is attached to top filter support channel. An irrigation timer (not shown) may be used to implement hydration cycles. Water chemistry solutions may be applied using this device to properly maintain the filter's media composition.

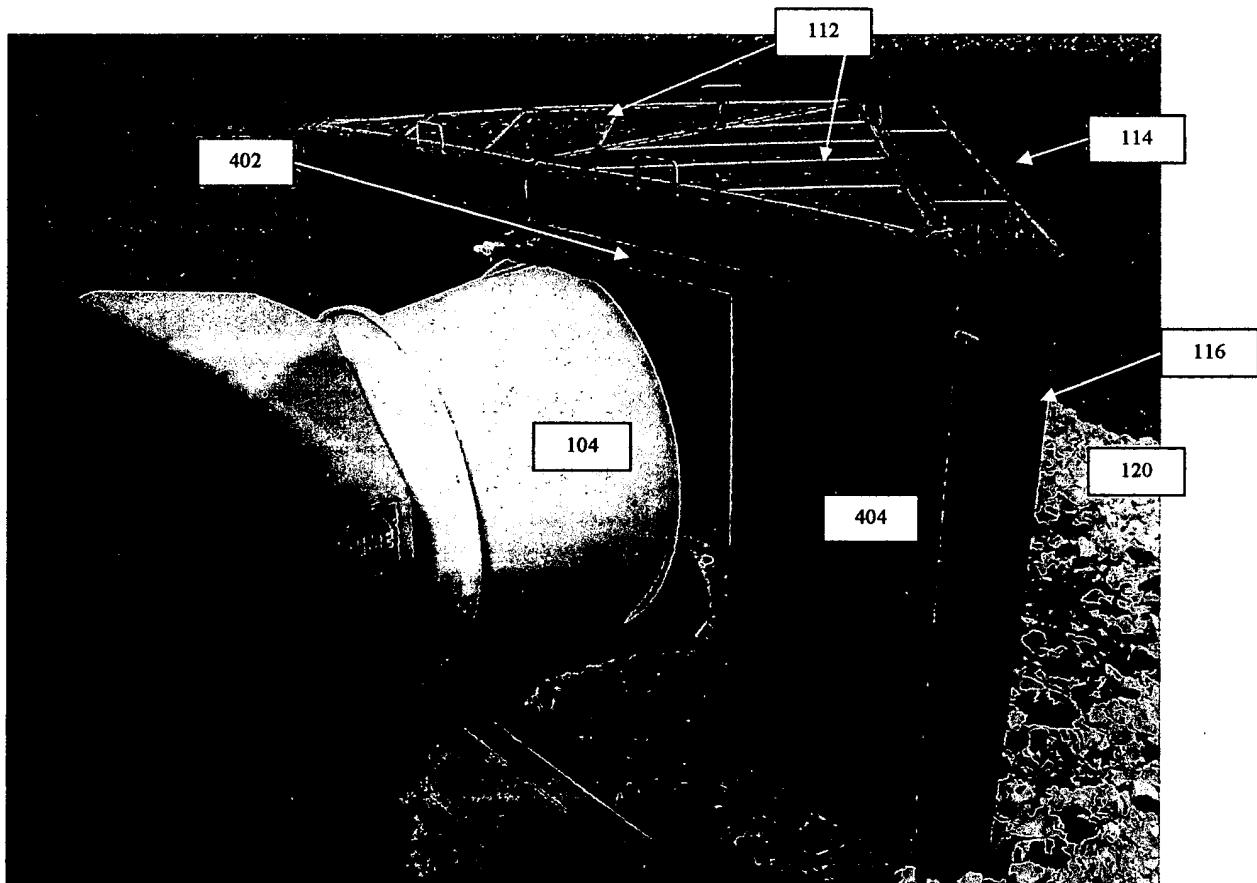


### **Numerical Legend:**

- 104-exhaust port
- 114-side section of filter system
- 116-frame of side section
- 302-exhaust fan outlet end
- 306-hydration device
- 402-top filter support channel

## **Figure 5: Upper Perspective View with Top Panels in Place**

Regulating the amount of non-filtered exhaust air can be achieved by attaching wing diverters to the side sections. Depending on the size of the exhaust fan, the wing diverters may be 18 inches to 24 inches wide and 37 inches long constructed of 18 gauge stainless steel.

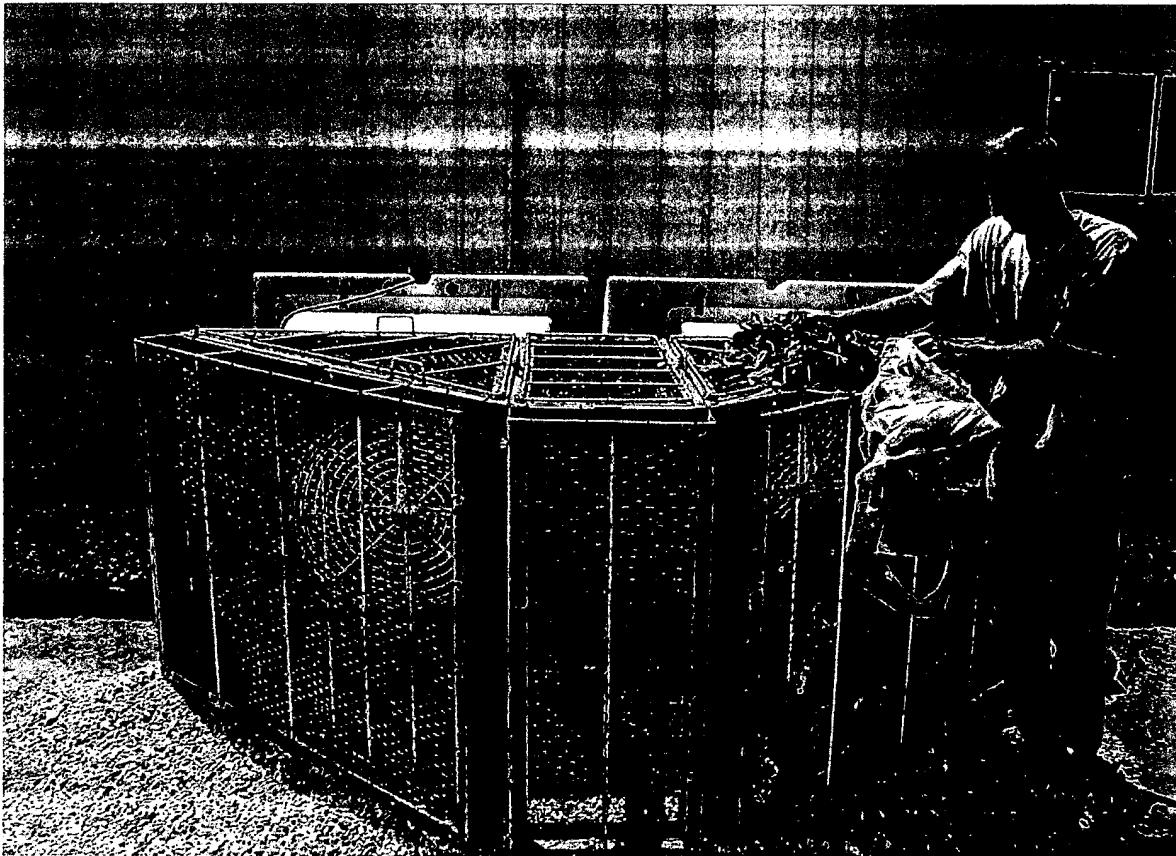


### **Numerical Legend:**

- 104: exhaust port
- 112: top sections of filter system
- 114: side section of filter system
- 116: frame of side section
- 120: rock base for filter system
- 402: support channel for top filter sections
- 404: wing diverters (non-filtered air device)

## **Figure 6: Addition of Filtering Material to Filter**

A western pine bark that ranges from 1 inch to 2 inches in size must be used to maintain proper ventilation flow rates. This environmentally friendly naturally occurring media provides an environment for odor reduction to occur.

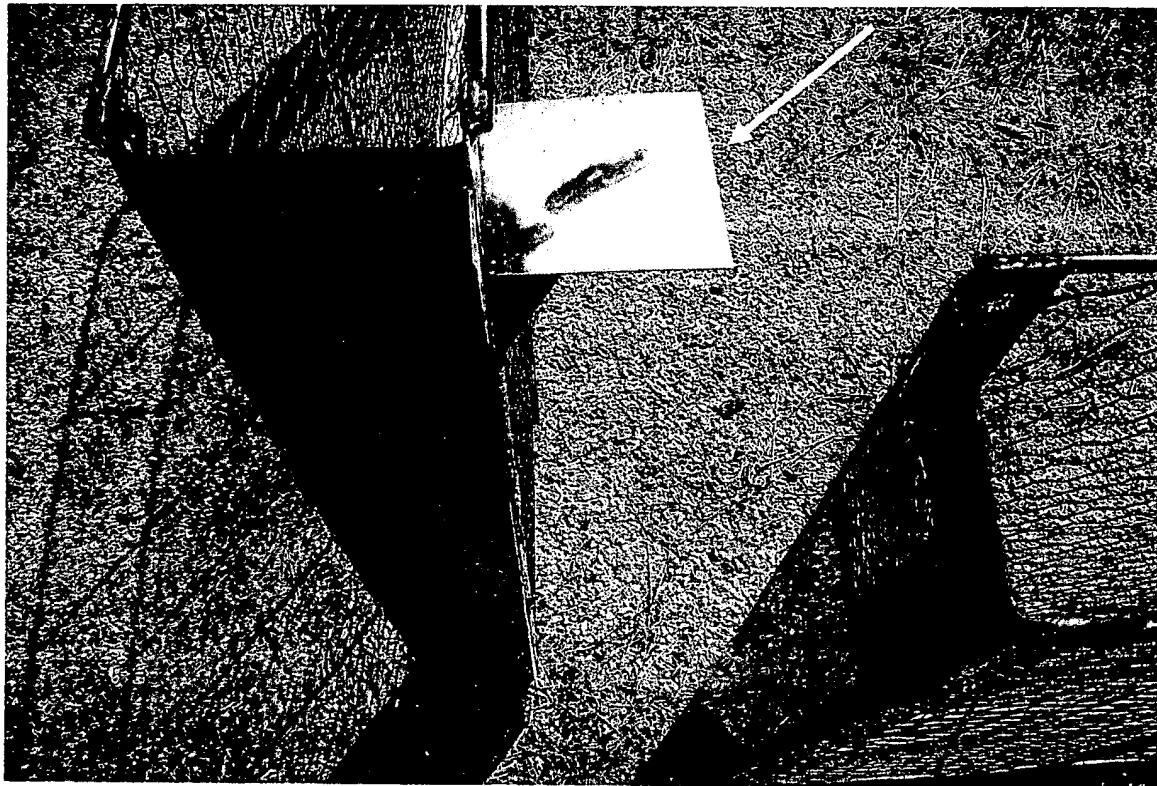


## **Summary**

The present apparatus represents a normal progression of thought from the originally submitted Detailed Description. By using stainless steel as the construction material for the frames and using PVC coated chicken wire as the containment mesh the scope and spirit of the invention was not sacrificed and material advantages occurred. References are made to swine production throughout this description. It should be understood that the present invention could be used in conjunction with exhaust ventilation from other odorous sources both agricultural and industrial. We have found that changing the thickness of the filtering panels along with some modification to design enhances the odor reduction capabilities of the odor filter.

## **Appendix A: Odor Reducing Filter Sections & Support Structures**

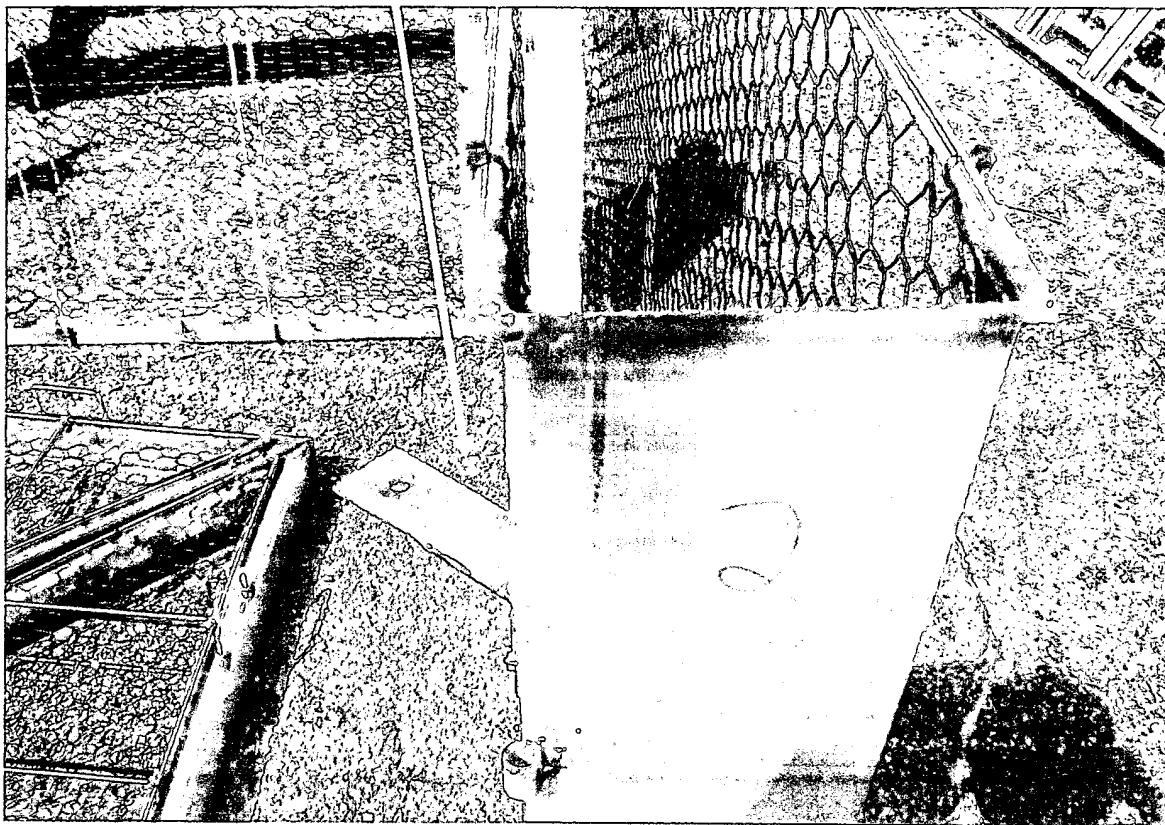
**Figure 7a: Support Plate for top filters (apex)**



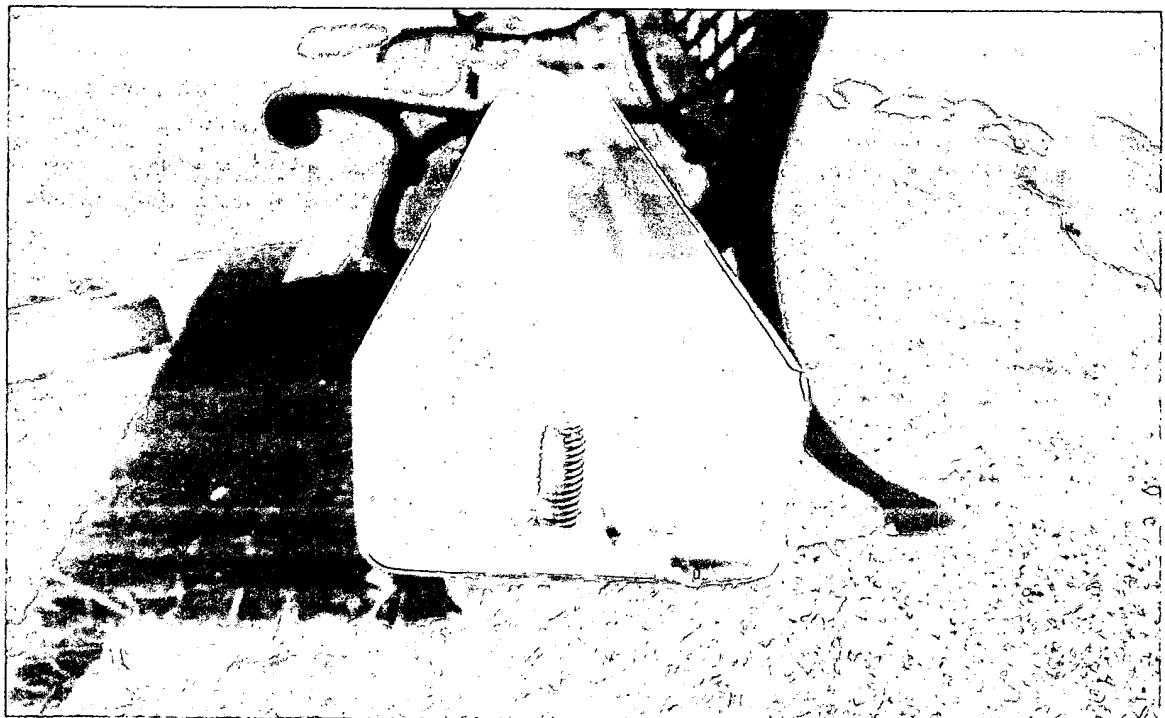
**Figure 7b: Support Plate**



**Figure 8: Rear Support Bracket Mount for Top Sections**



**Figure 9: Support Channel for Top Section Panels**



**Figure 10: Support Channel Connecting Side Panels**



**Figure 11: Single Top Section (opened)**

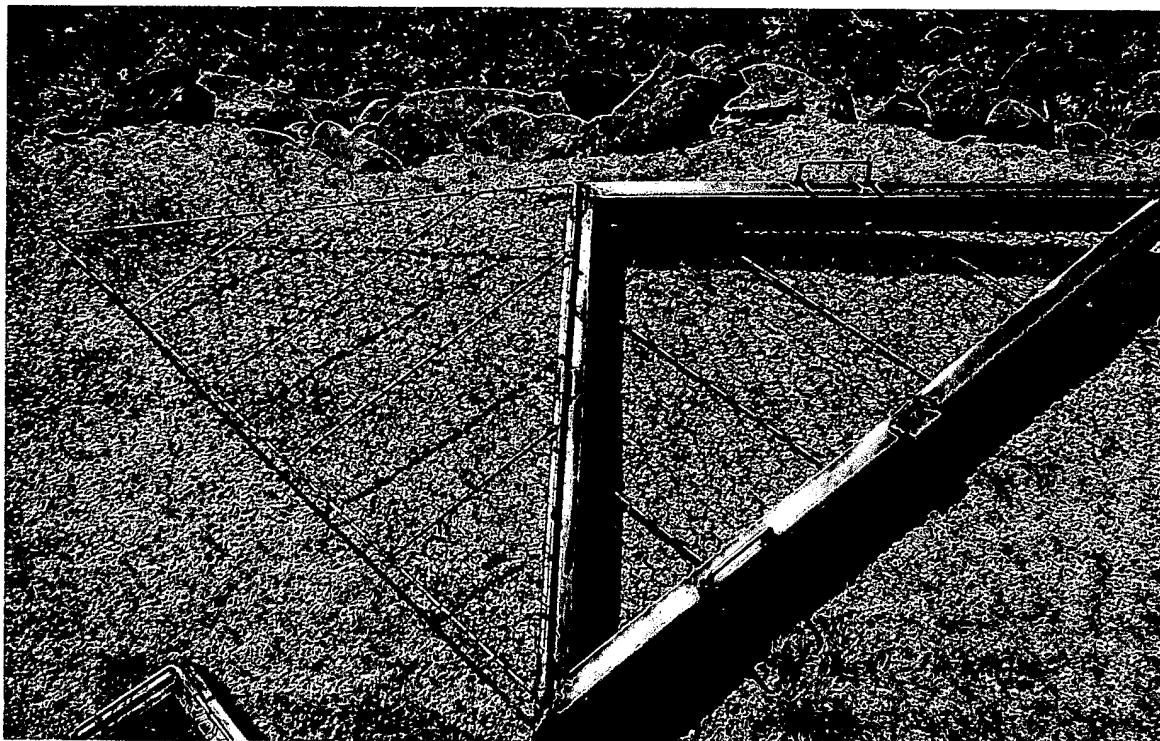


Figure 12: Hook for attachment to side panel to prevent gaps

